

AMENDMENT NO. 2 JULY 2020

TO

IS 16833 : 2018 AUTOMOTIVE TRACKING DEVICE (ATD) AND INTEGRATED SYSTEMS

[*Page 2, clause 4.22 (see also Amendment No. 1)*] — Insert the following at the end of the clause:

‘4.23 Time to First Fix (TTFF) — Time to first fix describes the time required for a tracking device to acquire adequate satellite signals and related data (almanac and ephemeris data) to compute location.

4.24 Type — Components, separate technical units or assemblies of different ‘Type’ means components, or assemblies which differ in such essential respects as trade name or mark and other technical details (requirements) as given in individual standard.’

(*Page 2, clause 4.6*) — Delete.

(*Page 2, clause 4.7*) — Delete.

[*Page 3, clause A-2.1 (1) (see also Amendment No. 1)*] — Substitute the following for the existing:

‘1) The system should support any operational GNSS system (Location, speed, heading, time stamp) data polling and capable of sending this data at a frequency shall be 5 sec during vehicle operation and not less than 10 minutes in sleep/ Ignition off a per protocol defined in **A-4**.

Device shall be capable for operating in L and/or S band and include support for NAVIC/IRNSS (Indian Regional Navigation Satellite System) for devices installed on vehicles on or after 1st April 2019. However, ATD devices shall be compliant as per other GNSS constellation in the interim period.’

[Page 3, clause **A-2.1** (5) (*see also Amendment No. 1*)] — Substitute the following for the existing:

‘5) The system’s GNSS module shall have an acquisition sensitivity of equal to or better than (-) 145 dBm with GNSS/ (-)140 dBm with IRNSS (NAVIC as applicable).’

[Page 3, clause **A-2.1** (6) (*see also Amendment No. 1*)] — Substitute the following for the existing:

‘6) The system’s GNSS module shall have a tracking sensitivity equal to or better than (-) 160 dBm with GNSS / (-)153 dBm with IRNSS (NAVIC as applicable).’

[Page 3, clause **A-2.1** (9) (*see also Amendment No. 1*)] — Substitute the following for the existing:

‘9) Should support standard digital I/O: 4 Digital, 2 Analogue Input and 1 Serial Communication (for example, RS232) for interfacing external systems (for example, Digital input for Emergency request button interfacing) and output for triggering other devices like hooter/flash light, etc.’

[Page 3, clause **A-2.1** (10) (*see also Amendment No. 1*)] — Substitute the following for the existing:

‘10) In case of use on buses it will provide the following additional information:

- a) Provide GPS data *via* RS 232/ RS485/CAN Ethernet to other On –Bus Devices (Such as PIS, CCTV system, ticketing system, etc.)
- b) Receive Route Number information from other On-Board devices and transmit to back end (Optional).
- c) Provide CAN interface to send relevant Vehicle Health data to Back end (Optional).
- d) Provision to provide Alerts Data/ VHMD to Other On-Bus devices (Optional).
- e) Provide Cellular module data transfer gateway to other on-bus devices (Optional).’

[Page 4, clause **A-2.1** (13) (*see also Amendment No. 1*)] — Substitute the following for the existing:

‘13) The system’s Cellular module should have:

- a) Multi slot GPRS with in-built quad-band GPRS module/modem,
- b) GPRS class 10 or above,

- c) Support Embedded SIM/UICC (As per as per GSMA guidelines / DoT (TEC) Guidelines) to cater to the automotive operational requirement such as vibration, temperature and humidity and provide long life span with at least 10 years life and more than 1 million read/write cycles, and
- d) GPRS module and Embedded SIM/UICC:
 - 1) Shall support SMS, Data (GPRS, TCP/IP); and
 - 2) Support multiple network OTA switching (on-demand/ automatic) capabilities.’

[Page 4, clause **A-2.1** (14) (see also Amendment No. 1)] — Substitute the following for the existing:

‘14) Device shall be manufactured by manufacturer whose quality management system has been certified for compliance to ISO / TS 16949 or ISO 9001 or any equivalent National or International standard.’

[Page 4, clause **A-2.1** (17)] — Substitute the following for the existing:

‘17) System shall be capable to operate with vehicle battery input voltage 12V d.c. and or 24V d.c.’

[Page 4, clause **A-2.1** (see also Amendment No. 1)] Insert the following at the end of the clause:

‘25) Device shall have sleep mode current $\leq 50\text{mA}$.’

[Page 4, clause **A-2.2** (see also Amendment No. 1)] — Substitute the following for the existing:

‘The device at least support below parameters should be configurable over the air (through SMS or Cellular). The update shall be allowed only over an ‘authenticated’ channel:

- a) Setting/ Change of the Primary or Secondary IP and port number,
- b) Setting/Change of the APN,
- c) Set configuration parameter like sleep time, over speed limit, harsh braking, harsh acceleration, rash turning threshold limits etc.,
- d) Emergency control and Activation/ Health Check control SMS Centre Number(s),
- e) Configuring the Vehicle registration number,
- f) Configuring the frequency of data transmission in normal/Ignition state/ OFF state sleep mode/health check message on SMS/Emergency state, etc,

- g) Configuration of time duration for emergency state,
- h) Capacity to reset device,
- j) Command to get the IMEI (International Mobile Station Equipment Identity)/ Health Status of the device,
- k) CLR: For clearing certain commands, alarms, alerts etc. except emergency alert.

SET: For setting parameters, and

GET: For enquiring regarding the parameters such as mobile number, GSM strength, vehicle number and other important parameters.

After each SET, GET, CLR command the device should send alert to Backend Control Centre, as mentioned in **A-4 Alert** (xii Table 2A), giving the details of Mode, mobile no/ IP of control centre sending commands.’

[Page 6, Table 1, Sl No. v) (see also Amendment No. 1)] Insert the following at the end in col (3) description:

‘HB = Harsh Breaking,

HA = Harsh Acceleration

RT = Rash Turning’

[Page 7, Table 2, Sl No. i), col 3] Substitute the following in col (3):

‘Message: Location Update (history)

Remarks: Would be sent, if Cellular is not available at the time of sending the message.’

[Page 8, clause **A-4.2**, Informal Table, ii), iii) and iv)] Substitute the following for the existing text:

<i>Sl No.</i>	<i>Attribute</i>	<i>Value / Description</i>	<i>Size</i>
ii)	Packet type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 2 bytes
iii)	IMEI No.	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
iv)	Packet status	NM — Normal packet, SP — Stored packet	Character, 2 bytes

[Page 8, clause **A-4.2.3** (see also Amendment No. 1)] — Substitute the following for the existing clause:

‘A-4.2.3 Activation SMS Format from State Backend/ Common Layer to Device and Health Check Random Messages from State Backend/ Common Layer to Device

Activation and Health Check Response SMS Format from Device to Backend System			
Field Name	Characters	Activation Example	Health Check Example
Header	5	ACTVR	HCHKR
Separator	1	,	
Random code	6	343434	474747
Separator	1	,	,
Vendor ID	4		
Separator	1	,	,
Firmware version	6	V1.6.1	V1.6.1
Separator	1	,	,
IMEI	15	012345678912345	012345678912345
Separator	1	,	,
Alert ID	2	1	1
Separator	1	,	,
Latitude	12	14.034533	14.034533
Separator	1	,	,
direction	1	N	N
Separator	1	,	,
Longitude	12	79.32045	79.32045
Separator	1	,	,
Direction	1	E	E
Separator	1	,	,
GPS fix	1	1	1
Separator	1	,	,

Activation and Health Check Response SMS Format from Device to Backend System			
Field Name	Characters	Activation Example	Health Check Example
Date and Time	15	16112018 120317	16112018 120317
Separator	1	,	,
Heading	6	263.19	263.19
Separator	1	,	,
Speed	4	25.4	25.4
Separator	1	,	,
GSM strength	2	23	23
Separator	1	,	,
Country Code (MCC)	3	404	404
Separator	1	,	,
Network Code (MNC)	4	10	10
Separator	1	,	,
LAC	4	d6d6	d6d6
Separator	1	,	,
Main Power	1	1	1
Separator	1	,	,
IGN Status	1	1	1
Separator	1	,	,
Battery Voltage	4	24.6	24.6
Separator	1	,	,
Frame Number	6	100000	100000
Separator	1	,	,
Vehicle mode	2	ID	ID
Total Characters	139		

(Page 9, clause **A-5.1**) — Substitute the following for the existing clause:

‘A-5.1 VLT Device Location

The VLT system shall be mounted in a suitable location such a way that it is not easily accessible /exposed to passengers.

This requirement shall not be applicable in case of combined systems VLT with HMI (Human Machine Interface) display in front of driver.’

[Page 9, clause **A-5.4** (see also Amendment No. 1)] — Substitute the following for the existing clause:

‘A-5.4 Emergency Button Requirements and Physical Mounting

Emergency button(s) shall be fitted in such a way that every passenger including driver shall be able to access the Emergency button(s). Passenger Car shall have at least one emergency buttons on each passenger row easily accessible by each of the passenger. There shall also be one dedicated emergency button for the driver row. Passenger Transport bus shall have emergency buttons at locations easily visible and accessible to all the passengers such as every 2 m on both the sides on passenger seating area. For seats reserved for ladies there shall be a dedicated panic button for each row. It shall be permissible to have a single emergency button for two successive ladies’ rows on both sides of the vehicle provided each lady passenger in either rows are able to reach and operate the emergency button.

In case of passenger transport bus which has a glass window covered between two pillars having pitch 2 m or more, the emergency buttons shall be provided on each pillar National Permit Trucks, shall have one dedicated emergency button for the driver row.’

[Page 9, clause **A-6** (see also Amendment No. 1)] — Substitute the following for the existing clause:

‘A-6 DEVICE LEVEL FUNCTIONAL, PERFORMANCE AND DURABILITY TESTS

- a) The tests have been classified as Type Tests and Acceptance Tests.
- b) The tests have been divided into categories.

The devices can be tested and certified from the testing agencies referred to in rule 126 of the CMVR for compliance to the rule 125 H of CMVR.’

[Page 9, clause **A-6**, (a) and (b) (see also Amendment No. 1)] — Delete.

[Page 9, clause **A-6.1** (see also Amendment No. 1)] — Substitute ‘List of Tests’ for ‘Type Tests’.

(Page 9, clause **A-6.1**) — Delete ‘The following shall constitute type test:’

(Page 9, clause **A-6.2**) — Delete.

[Page 11, clause **A-7.1** (f) and (g) (see also Amendment No. 1)] — Substitute the following for the existing matter:

‘f) *Acquisition sensitivity test* — Acquisition sensitivity refers to the minimum signal level at which the device is able to successfully perform a cold start TTFF. The acquisition sensitivity test is a simulated signal test. A device cold start is performed, and the time to acquisition is measured. Signal levels are then progressively increased. Allow the receiver to successfully perform cold start TTFF. The minimum signal level is referred as to be acquisition sensitivity. This signal strength is recorded.

Acceptance Criteria: The acquisition sensitivity shall be minimum (-) 145 dBm with GNSS/ (-) 140 dBm with IRNSS (NAVIC as applicable.).

g) *Tracking sensitivity test* — Tracking sensitivity refers to the minimum signal level at which the device is able to successfully maintain the location fix. The tracking sensitivity test is a simulated signal test. Test setup for the tracking sensitivity receiver test is as shown in Fig. 3. The device under this test is locked on to the simulator’s output frequency and the simulator power output is lowered until the lock is lost. Multiple repetition of the test with different satellite geometries ensures that an accurate average measure is recorded.

Acceptance Criteria: The tracking sensitivity shall be equal to or better than (-) 160 dBm with GNSS / (-) 153 dBm with IRNSS (NAVIC as applicable).’

[Page 12, clause **A-7.1** (j) (see also Amendment No. 1)] — Substitute the following for the existing matter:

‘j) *On vehicle dynamic location test* — VLT devices will be mounted on any target vehicle connected with vehicle battery. Target vehicle with VLT devices will be run for 10 km on pre-defined track/route to verify dynamic location test. VLT device PVT data shall be within ± 12 m for more than 90 percent of the fixed location data.’

[Page 13, clause **A-7.2** (e) (see also Amendment No. 1)] — Substitute ‘High Voltage Test’ for ‘Over voltage protection test’

[Page 14, clause A-7.3 (a)] — Substitute ‘Dry Heat/High Temperature Test’ for ‘High Temperature Test’

[Page 14, clause A-7.3 (g) (see also Amendment No. 1)] — Delete.

[Page 15, Table 4, SI No. iv) (see also Amendment No. 1)] — Substitute the following for the existing matter:

SI No.	Field	Description
(1)	(2)	(3)
iv)	Packet Type	Specify the packet type : NR = Normal EA = Emergency alert TA = Tamper alert HP = Health packet IN = Ignition on IF = Ignition off BD = Vehicle battery disconnect BR = Vehicle battery reconnect BL = Internal battery low HB = Harsh breaking, HA = Harsh acceleration RT = Rash turning

[Page 15, Table 5 (see also Amendment No. 1)] — Substitute the following for the existing matter:

SI No.	Alert ID	Message	Remarks
(1)	(2)	(3)	(4)
i)	1	Location Update	Default message coming from each device
ii)	2	Location Update (history)	Would be sent, if GPRS is not available at the time of sending the message
iii)	3	Alert – Disconnect from main battery	If device is disconnected from vehicle battery and running on its internal battery
iv)	4	Alert – Low battery	If device internal battery had fallen below a defined threshold, indicating that device need to get a recharge

SI No.	Alert ID	Message	Remarks
(1)	(2)	(3)	(4)
v)	5	Alert – Low battery removed	Indicate that vehicle internal battery is charged again
vi)	6	Alert – Connect back to main battery	Indicate that vehicle is connected back to main battery
vii)	7	Alert – Ignition ‘ON’	Indicates that vehicle has started (ignition ‘ON’)
viii)	8	Alert – Ignition ‘OFF’	Indicates that vehicle has stopped (ignition ‘OFF’)
ix)	9	Alert – GPS box opened (Optional)	Optional message would be generated indicating GPS box opened
x)	10	Alert – Emergency state ‘ON’	When any of the emergency button is pressed
xi)	11	Alert – emergency state ‘OFF’	When emergency state of vehicle is removed
xii)	12	Alert Over the air parameter change	Alerts for any parameter is changed over the air. Shall include the name/ value of parameter changed and source of command. Shall include the name/ value of parameter changed and source of command
xiii)	13	Harsh braking	Alert indicating for harsh braking.
xiv)	14	Harsh acceleration	Alert indicating for harsh acceleration
xv)	15	Rash turning	Alert indicating for rash turning
xvi)	16	Device tempered	Alert Indicating Emergency button wire disconnect/ wire cut etc.

[*Page 17, Table 6, SI No. iii) and iv)] — Substitute the following for the existing matter:*

SI No.	Attribute	Value / Description	Size
(1)	(2)	(3)	(4)
iii)	IMEI Number	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
iv)	Packet Status	NM – Normal packet, SP – Stored packet	Character, 2 bytes

[Page 17, Table 6, Sl No. xvii)] — Insert the following at the end of the table:

Sl No.	Attribute	Value / Description	Size
(1)	(2)	(3)	(4)
xvii)	End Character	*	1 byte

(Page 17, clause A-7.4) — Insert the following new clause:

‘A-8 CODE OF PRACTICE FOR IMPLEMENTATION OF VEHICLE LOCATION TRACKING (VLT) DEVICE, EMERGENCY BUTTON(S) AND COMMAND AND CONTROL CENTRES

This Code (*see* Annex A) has been formulated for facilitating smooth implementation of vehicle location tracking (VLT) Device, emergency button(s) and command and control centers for the guidance of the stakeholders concerned.

A-8.1 General

- a) The VLT device manufacturers will get their devices tested and certified from the testing agencies referred to in rule 126 of the CMVR for compliance to the rule 125 H of CMVR
- b) The backend system shall mean the backend command and control centre set up/ authorized by State/UT or VLT manufacturers, providing interface to various stakeholders/systems such as State emergency response centre, the transport department or Regional Transport Offices, Ministry of Road Transport and Highways and its designated agency, VAHAN (or any other State/UT system used for registration of vehicles and/or issuance of permits), VLT device manufacturers and their authorized dealers, testing agencies, permit holders, etc. In the absence of State/UT backend system, the registration, activation, health check and alert updates of VLT devices shall be through a common layer for update in VAHAN.

The details of each VLT device (VLT device manufacturer code, device serial number, IMEI number, IccID number and other details as notified by the Central Government/State Government) shall be uploaded on the VAHAN directly or through backend system by the VLT device manufacturer using its secure authenticated access.

The VLT device manufacturers or their authorized dealers shall install the VLT devices in vehicles and register/activate the devices along

with details of vehicle and permit holder on the corresponding backend systems in real time as per the process set out below

The backend system/common layer will update the details of device in the VAHAN system against the respective vehicle record at the time of installation and registration/activation of VLT device.

- c) The VLT device manufacturers or their authorized dealers, at the time of installation of VLT device in vehicles, shall configure the IP address and SMS gateway details in the device for sending emergency alerts to the emergency response system of the State/UT concerned.
- d) The VLT device manufacturers or their authorized dealers, at the time of installation of VLT device in vehicles, shall configure the configuration parameters mentioned in Annex A in the device such as IP address and SMS gateway details for sending required data to the backend system.
- e) The VLT device manufacturers shall ensure that a control mechanism is established for the secure data transfer from VLT to the backend system and that only the authorized devices transfer data to the backend system. The VLT device manufacturers shall also ensure that the mechanism for authenticating the vehicle owner and devices is followed as per the protocol specified in Annex A or such additional requirements as specified by the States/UTs. Authentication of vehicle shall be done through an OTP sent on vehicle owner's mobile number from the corresponding backend system.
- f) In case of press of an emergency button, the VLT device will send data directly to the emergency response system of the respective State/UT. In addition, the backend system will send the alert to the respective permit holder, as decided by the State/UT.
- g) VLT device manufacturers shall get their devices tested for conformity of production every year from the date of first certification, from the testing agencies referred to in Rule 126 of the CMVR.
- h) VLT device manufacturers shall get their backend systems certified for the States/UTs from the testing agencies referred to in Rule 126 of the CMVR/ STQC/NIC.
- j) The VLT device manufacturers or their authorized dealers, at the time of installation of VLT devices in vehicles, shall configure the VLT device to send a secure authenticated activation message directly to the State/UT backend system/common layer as per the details provided in **A-4.2.3**.

- k) The VLT device manufacturers shall ensure that the Health Check parameters are configured in the VLT device to send health check messages, on request from the state/UT backend system/common layer, to the respective backend system through SMS as per reference protocol mentioned in this **A-4.2.3**.
- m) VLT device manufacturers or their authorized dealers shall provide comprehensive warranty/maintenance support for the VLT device and facilitate cellular connectivity in accordance with the guidelines issued by central government vide *Motor Vehicles (Vehicle Location Tracking Device and Emergency Button) Order, 2018* as amended from time-to-time.
- n) The testing agencies will verify the conformity of production for the VLT devices as prescribed in **A-8.4**.

A-8.2 Installation, Registration, Activation and Service Process for VLT Device

- a) VLT device manufacturers or their authorized dealers shall install VLT devices on permit holder's vehicles (only tested and approved model).
- b) VLT device manufacturers shall ensure necessary uploading/integration of the installation/activation data to the backend system/VAHAN.
- c) In case of any problem in updating VAHAN, it will be VLT device manufacturer's responsibility to resolve the same.
- d) VLT device manufacturers or their authorized dealers will also provide necessary print of installation/activation report to permit holder from the respective backend system.
- e) Regional Transport Offices shall be able to verify the registration/activation/functional status of VLT device in the VAHAN/corresponding backend system at the time of fitness testing.
- f) The permit holder will have option to check the installation and device working status in the VAHAN.
- g) The VLT device manufacture may offer value added services, in addition to the mandatory performance requirements to the permit holders as per the mutual agreement between them. Mandatory performance requirements shall mean the following:
 - 1) Uploading device data in VAHAN,
 - 2) Updating registration and activation data of VLT device,

- 3) Sending device health status to the backend system,
 - 4) Sending emergency alerts to the corresponding State/UT emergency response system,
 - 5) Sending over speeding alerts to the backend system, and
 - 6) Other performance requirements as per Annex A and as notified by central government *vide Motor Vehicles (Vehicle Location Tracking Device and Emergency Button) Order, 2018* as amended from time-to-time.
- h) The VLT device manufacturers may create their own system to monitor their supplied devices, emergency button/s and connectivity working / nonworking status for managing warrantee / AMC and Cellular services.
 - j) The VLT device manufacturers or their dealers will update the SIM numbers and their validity/renewal details in the backend system.

A-8.3 VLT Device Manufacturers Backend Application/System Requirements

In case VLT device manufacturer offers to provide its backend system for State/ UT, the same will need to meet the following requirements, in addition to those specified in **A-2.4**.

- a) The application will provide the ability to locate a vehicle at a given time.
- b) Facility to track defined vs. actual movement of vehicles, capture deviations if any (For vehicles where scheduled movement can be defined on GIS map).
- c) The application should provide ability to track vehicle location on map. The map engine and data should comply with applicable regulations including guidelines as set out by Survey of India from time-to-time.
- d) Facility for users to access and view position / location information on GIS maps near real-time through web interface with historic data displayed on maps.
- e) Facility for providing current information location on demand.
- f) Facility for playing back the recorded details of the vehicle movement along the authorized route (where applicable).
- g) Provide facility of alert generation for the following instances/which includes the following:
 - 1) Ability to define new alerts on specific events.
 - 2) From the on-board devices in case of tampering.

- 3) Speed exceeds the permissible limit.
- 4) Vehicle moves out of its designated route or area.
- 5) Data feed not received from the on-board device.
- h) Provide facility to define rules for alerts/ notification and their delivery mode like SMS, email, pop-up etc.
- j) Management of notifications to various stakeholders by way of email or SMS, for example, permit holders, RTO about device not working, over-speeding, etc.
- k) Notification to the permit-holder through SMS in case any device stops functioning/sending data to the application.
- m) Capability to update the on-board devices' firmware from the backend.
- n) Capability to configure on-board device parameters from the backend.
- p) The tracking data will be kept live in the system for at least 90 days. Utilities will be provided to support archive and restore functions for older data. Alerts/reporting shall be available for one year in the backend.
- q) The backend will store VTS time-related data at the same resolution as received in the live application. The archived data after 90 days can also be restored using utilities provided.
- r) From a security perspective, the devices will not communicate to any IP address located outside India whether it be the manufacturer's application or for purposes of configuration or firmware updates.
- s) Firmware of the device needs to be available for auditing to notified testing agencies. Firmware binary should be made available with version matching one in the device as well as binary size and modification timestamp and/ or checksum should match for the binary provided and one installed on device.

Backend system should be able to remotely read the existing version number of the firmware via an OTA configuration read command. A new version of the firmware should be pushed over the air from the VLT manufacturer's application. This shall be verified by the backend system remotely reading the new version number of the firmware in the device via and OTA configuration read command.

- t) The device will communicate only to whitelisted set of IP addresses located in India and will receive communication and commands also from whitelisted set of IP addresses located in India.

- u) The application and all key components like device management, firmware control, GIS map shall be hosted at a data centre/ cloud in India and it will be available for auditing by regulatory agencies.
- v) The system shall provide more than 99 percent availability and adhere to infrastructure security, vulnerability assessment and penetration testing guidelines as set out by Ministry of Electronics, Information and Technology, Govt of India.
- w) No data should flow out of the country under any circumstances in compliance with applicable laws/regulations/guidelines.
- y) The common layer shall be got tested from the testing agencies specified in CMVR Rule 126/STQC/NIC for the following minimum functionalities:
 - 1) Registration and activation of the device(s) fitted on the vehicle, including the details of vehicle registration number, engine number, chassis number, vehicle make and model, device make and model, and connectivity details (telecom service provider's name, ICCId, SIM Nos., IMSI, date of validity, etc.).
 - 2) Publish VLT device details in the VAHAN/ any other State/ UT system used for registration of vehicles and/or issuance of permits
 - 3) Re-registration/re-activation of the device(s) fitted on the vehicle in case of any change in device or telecom service provider, etc.
 - 4) Periodic health check of the device(s) fitted on the vehicle through SMS, as per **A-4.2.3**.
 - 5) Receiving alerts from VLT devices in case of defined deviations by vehicle such as over-speeding, etc. Publish alerts and health check received from VLT device in the VAHAN/ any other State/UT system used for registration of vehicles and/or issuance of permits.
 - 6) Provide interface to VAHAN, respective State/UTs, RTOs, testing agencies, VLT device manufacturer's and their dealers.

B Publish Data to Common Layer by VLT Device Manufacturers' Applications (Sample) Requirement to be complied with by VLT device manufacturers' applications

Application shall publish the data to common layer in a specified frequency and format as mentioned below

Services to publish data to the common layer

1. Push Offence Details

Type : REST web service

Data Type : JSON Array

Frequency : 1 h

A single request may contain JSON Array of maximum 500 JSON Objects of the following format.

Sl No.	Key	Value Length in bytes	Description
(1)	(2)	(3)	(4)
In Parameters			
i)	oftyp	2	Offence Type OS= Overspeed
ii)	vno	16	Vehicle number without any delimiter like hyphen (-) or space.
iii)	imei	15	IMEI number.
iv)	date	8	Date in format DDMMYYYY
v)	time	6	UTC in format hhmmss
vi)	lat	12	Latitude, decimal not less than 6 places
vii)	latd	1	Latitude direction. N = North, S = South
viii)	lon	12	Longitude, decimal not less than 6 places
ix)	lond	1	Longitude direction. E = East, W = West
x)	spd	6	Speed in km/h, Up to One Decimal Value.
xi)	loc		Location (Reverse Geo-coded)
xii)	rto		RTO Code
xiii)	state		State Code
Response			
xiv)	resp		OK/ Error

2. Push Alert Details

Type : REST web service

Data Type : JSON Array

Frequency : 1 h

A single request may contain JSON Array of maximum 500 JSON Objects of the following format.

Sl No.	Key	Value Length in bytes	Description
(1)	(2)	(3)	(4)
In Parameters			
i)	alrtid	2	Alert ID as per AIS-140
ii)	vno	16	Vehicle number without any delimiter like hyphen (-) or space.
iii)	imei	15	IMEI number.
iv)	date	8	Date in format DDMMYYYY
v)	time	6	UTC in format hhmmss
vi)	lat	12	Latitude, decimal not less than 6 places
vii)	latd	1	Latitude direction. N = North, S = South
viii)	lon	12	Longitude, decimal not less than 6 places
ix)	lond	1	Longitude Direction. E = East, W = West
x)	spd	6	Speed in km/h, Up to One Decimal Value.
xi)	loc		Location (Reverse Geo-coded)
xii)	rto		RTO Code
xiii)	state		State Code
Response			
xiv)	resp		OK/ Error

A-8.4 Conformity of Production — Testing Parameters

- a) The VLT device manufacturers will get their devices tested and certified for conformity of production from the testing agencies referred to in Rule 126 of the CMVR for compliance to the Rule 125 H of CMVR every year from the date of first certification. The parameters for testing shall be as specified in Table on Test for COP of VLT Device and Emergency Buttons given below.
- b) The VLT device manufacturers shall get their backend applications audited from the testing agencies referred to in Rule 126 of the CMVR/ STQC/NIC or by the agencies specified by States/UTs every year from the date of first certification. The parameters for auditing shall be as specified in the Table on Test Parameters for Auditing of VLT Device Manufacturer's Backend Application/System given in this clause.
- c) The testing agencies shall provide the details of the VLT devices and backend applications certified by them to the States/UTs by uploading the same on the respective backend systems or any other means.

Test for COP of VLT Device and Emergency Buttons

Sl. No.	Test Details (As per Annex A)
(1)	(2)
i)	Emergency button functionality [<i>see A-3, (c)</i>]
ii)	SMS fall back [<i>see A-3, (d)</i>]
iii)	Functional Testing [<i>see A-7.1, (a) to (h)</i>]
iv)	Performance Parametric Test [<i>see A-7.2, (a)</i>]
v)	Protocol and alerts verification as per — A-2.3 and the table on health parameters, — Table 1 and 2 of A-4 — Table on Page 8 of IS 16833, — OTA Commands verification [<i>see A-2.2</i>]
vi)	Ingress Protection (IP) Test [<i>see A-7.2, (d)</i>]

**Test Parameters for Auditing of VLT Device Manufacturer's
Backend Application/System**

Sl. No.	Test Details (As per Annex A)
(1)	(2)
i)	Firmware over the air update. Backend application should be able to remotely read the existing version number of the firmware via an OTA configuration read command. A new version of the firmware should be pushed over the air. This should be verified by reading the new version number of the new firmware in the device via and OTA configuration read command.
ii)	Application availability test to be conducted over a 7 day period by periodic check of availability randomly or at specified intervals in an automated or manual manner.
iii)	Test functionality of application to allow user to map and un-map a device to a vehicle.
iv)	Test functionality to track a vehicle on a map over a period of 8 h given either a device ID or vehicle registration number. The device ID and vehicle should be mapped beforehand.
v)	Test replay of a vehicles location by specifying a start and end date and time and device ID or vehicle registration number. The start and end date and time should be from within the last 3 months at date of test. In case 3 months of historical data is not available, the VLT manufacturer can pre populate test data for the duration.
vi)	Firmware binary should be made available with version matching one in the device as well as binary size and modification timestamp and/ or checksum should match for the binary provided and one installed on device.
vii)	Test to confirm geographical location of IP addresses, the device communicates with by IP Geolocation for all IPs configured into the device to confirm they are in India. The IPs configured should be read from the firmware configuration via configuration read command and also separately confirmed against a list of IPs provided by the VLT manufacturer.

Sl. No.	Test Details (As per Annex A)
(1)	(2)
viii)	VLT manufacturer to provide a certificate, statement or affidavit certifying the location of data centre/ cloud hosting region in India for user, device and vehicle data.
ix)	VLT manufacturer to provide a vulnerability analysis and penetration testing report from a third party test agency authorized by CERT-In/STQC.

A-8.5 CRITERIA FOR EXTENSION OF TYPE APPROVAL

In case of following changes, Functional, Performance, Durability and Environmental Tests which are necessary for establishing compliance are listed below:

Sl No.	Changes in System	Tests to be conducted
(1)	(2)	(3)
B1.1	Change in Make, Model, Type, accompanied with or without a Part No. of Vehicle Location Tracking (VLT) and Vehicle Health Monitoring.	Applicable tests as per A-6 and Functional verification at system integration level or component level as applicable
B1.2	Change in software of ITS System	Functional verification at system integration level
B1.3	Change in wiring harness	Wiring harness requirements specified in this standard

[Page 17, clause **B-2.1** (1)] — Substitute the following for the existing:

‘1) The system should support any operational GNSS system (Location, speed, heading, time stamp) data polling and capable of sending this data at a frequency shall be 5 s during vehicle operation and not less than 10 min in sleep/ Ignition off a per protocol defined in **B-4**.

Device shall be capable for operating in L and/or S band and include support for NAVIC/IRNSS (Indian Regional Navigation Satellite System) for devices installed on vehicles on or after 1st April 2019. However ATD devices shall be compliant as per other GNSS constellation in the interim period.’

[Page 18, *clause B-2.1 (5)*] — Substitute the following for the existing:

‘5) The system’s GNSS module shall have an acquisition sensitivity of equal to or better than (-) 145 dBm with GNSS/ (-)140 dBm with IRNSS (NAVIC as applicable).’

[Page 18, *clause B-2.1 (6)*] — Substitute the following for the existing:

‘6) The system’s GNSS module shall have a tracking sensitivity equal to or better than (-) 160 dBm with GNSS / (-)153 dBm with IRNSS (NAVIC as applicable).’

[Page 18, *clause B-2.1 (8)*] — Substitute the following for the existing:

‘8) The system’s GNSS module should have:

- a) The capability of hot start < 10s
- b) The capability of warm start < 60s
- c) The capability of cold start < 120s’

[Page 18, *clause B-2.1 (9)*] — Substitute the following for the existing:

‘9) Should support standard digital I/O: 4 digital, 2 analogue input and 1 serial communication, (for example, RS232) for interfacing external systems (for example, digital input for emergency request button interfacing) and output for triggering other devices like hooter/flash light etc.’

[Page 18, *clause B-2.1 (12)*] — Substitute the following for the existing:

‘12) The system’s Cellular module should have:

- a) Multi slot GPRS with In - Built quad-band GPRS module/modem
- b) GPRS class 10 or above
- c) Support embedded SIM/UICC (As per as per GSMA guidelines / DoT (TEC) Guidelines) to cater to the automotive operational requirement such as vibration, temperature and humidity and provide long life span with at least 10 years life and more than 1 million read/write cycles
- d) GPRS module and embedded SIM/UICC:
 - 1) Shall support SMS, data (GPRS, TCP/IP) and

- 2) Support multiple network OTA switching (on-demand/ automatic) capabilities.’

[Page 18, clause **B-2.1** (16)] — Substitute the following for the existing:

‘16) System shall be capable to operate with vehicle battery input voltage 12VDC and or 24VDC.’

[Page 19, clause **B-2.3**] — Substitute the following for the existing clause:

‘B-2.3 Configuration of Device Parameters Over the Air (OTA)

The device at least support below parameters should be configurable over the air (through SMS or Cellular). The update shall be allowed only over an ‘authenticated’ channel:

- a) Setting/ Change of the primary or secondary IP and port number
- b) Setting/Change of the APN
- c) Set configuration parameter like sleep time, over speed limit, harsh braking, harsh acceleration, rash turning threshold limits, etc.
- d) Emergency control and activation/ health check control SMS centre number(s),
- e) Configuring the vehicle registration number,
- f) Configuring the frequency of data transmission in normal / Ignition state / OFF state sleep mode/ health check message on SMS / emergency state, etc.
- g) Configuration of time duration for emergency state,
- h) Capacity to reset device,
- j) Command to get the IMEI (International Mobile Station Equipment Identity)/ health status of the device,
- k) CLR: For clearing certain commands, alarms, alerts, etc, except emergency alert.

SET: For setting parameters,

GET: For enquiring regarding the parameters such as mobile number, GSM strength, vehicle number and other important parameters.

After each SET, GET, CLR command the device should send alert to backend control centre, as mentioned in **B-4** , giving the details of mode, mobile no/ IP of control centre sending commands.’

(Page 20, clause **B-4.1**, line 11) — Substitute the following for the existing matter:

‘but can be in any sequence and with any separator’

[Page 21, Table 7, Sl No. v)] — Substitute the following for the existing matter:

Sl No. (1)	Field (2)	Description (3)	Sample Data (4)
v)	Packet Type	Specify the packet type – NR = Normal EA = Emergency alert TA = Tamper alert HP = Health packet IN = Ignition on IF = Ignition off BD = Vehicle battery disconnect BR = Vehicle battery reconnect BL = Internal battery low HB = Harsh breaking, HA = Harsh acceleration RT = Rash turning	NR

[Page 23, clause **B-4.2**, Informal Table, Sl. No. ii), iii) and iv)] — Substitute the following for the existing matter:

Sl No.	Attribute	Value/Description	Size
ii)	Packet type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 2 bytes
iii)	IMEI No	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
iv)	Packet Status	NM – Normal packet, SP – Stored packet	Character, 2 bytes

(Page 24, clause **B-5.1**) — Substitute the following for the existing matter:

‘B-5.1 VLT Device Location

The VLT system shall be mounted in a suitable location such a way that it is not easily accessible /exposed to passengers.

This requirement shall not be applicable in case of combined systems VLT with HMI (Human Machine Interface) display in front of driver.’

(Page 24, clause **B-5.4**) — Substitute the following for the existing matter:

‘B-5.4 Emergency Button requirements and Physical Mounting

Emergency button(s) shall be fitted in such a way that every passenger including driver shall be able to access the Emergency button(s). Passenger Car shall have at least one emergency buttons on each passenger row easily accessible by each of the passenger. There shall also be one dedicated emergency button for the driver row. Passenger Transport bus shall have emergency buttons at locations easily visible and accessible to all the passengers such as every 2 m on both the sides on passenger seating area. For seats reserved for ladies there shall be a dedicated panic button for each row. It shall be permissible to have a single emergency button for two successive ladies’ rows on both sides of the vehicle provided each lady passenger in either rows are able to reach and operate the emergency button.

In case of passenger transport bus which has a glass window covered between two pillars having pitch 2m or more, the emergency buttons shall be provided on each pillar. National Permit Trucks, shall have one dedicated emergency button for the driver row.’

(Page 24, clause **B-6**) — Substitute ‘DEVICE LEVEL FUNCTIONAL, PERFORMANCE AND DURABILITY TESTS’ for ‘TESTS’ in the heading.

[Page 24, clause **B-6** (a) and b)] — Delete.

(Page 24, clause **B-6.1**) — Substitute ‘List of Tests’ for ‘Type Tests’ in the heading.

(Page 24, clause **B-4.1**, line no 1) — Delete.

[Page 24, clause **B-6.2** (see also Amendment No. 1)] — Delete.

[Page 25, clause **B-7.1** (f) and g) (see also Amendment No. 1)] — Substitute the following for the existing matter:

‘f) *Acquisition sensitivity test* — Acquisition sensitivity refers to the minimum signal level at which the device is able to successfully perform a cold start TTFF. The acquisition sensitivity test is a simulated signal test. A device cold start is performed, and the time to acquisition is measured. Signal levels are then progressively increased. Allow the receiver to successfully perform cold start TTFF. The minimum signal level is referred as to be acquisition sensitivity. This signal strength is recorded.

Acceptance criteria: The acquisition sensitivity shall be minimum (-) 145 dBm with GNSS/ (-) 140 dBm with IRNSS (NAVIC as applicable.).

g) *Tracking sensitivity test* — Tracking sensitivity refers to the minimum signal level at which the device is able to successfully maintain the location fix. The tracking sensitivity test is a simulated signal test. Test setup for the tracking sensitivity receiver test is as shown in Fig. 3. The device under this test is locked on to the simulator’s output frequency and the simulator power output is lowered until the lock is lost. Multiple repetition of the test with different satellite geometries ensures that an accurate average measure is recorded.

Acceptance Criteria: The tracking sensitivity shall be equal to or better than (-) 160 dBm with GNSS / (-) 153 dBm with IRNSS (NAVIC as applicable).’

[Page 26, clause **B-7.1** (j) (see also Amendment No. 1)] — Substitute the following for the existing matter:

‘j) *On vehicle dynamic location test* — VLT devices will be mounted on any target vehicle connected with vehicle battery. Target vehicle with VLT devices will be run for 10 km on pre-defined track/route to verify dynamic location test. VLT device PVT data shall be within ± 12 m for more than 90 percent of the fixed location data.’

[Page 31, clause **B-7.4**, SI No. ii), iii) and iv)] — Substitute the following for the existing matter:

SI No.	Attribute	Value/Description	Size
(1)	(2)	(3)	(4)
ii)	Packet type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 2 bytes

SI No.	Attribute	Value/Description	Size
(1)	(2)	(3)	(4)
iii)	IMEI No	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
iv)	Packet Status	NM – Normal packet, SP – Stored packet	Character, 2 bytes

(Page 32, clause C-1) — Substitute the following for the existing clause:

‘C-1 GENERAL

This annex will be applicable only to those buses which are fitted with GPS tracking devices as per Annex A. It primarily covers the functional specifications, test and protocol requirements of ‘CCTV system with an integrated emergency system for buses.’

[Page 33, clause C-5.2 (18)] — Insert the following at the end:

‘The devices installed on or before 31 August 2020 may support embedded SIM or Plastic SIM for the above requirement. Plastic SIM and recorder to be tested along with SIM as per tests prescribed elsewhere in the Standard. The status shall be reviewed before the end of the stipulated period.’

[Page 33, clause C-5.2 (19)] — Delete.

[Page 33, clause C-5.2 (20)] — Delete.

[Page 34, clause C-5.3 (2)] — Substitute the following for the existing matter:

‘2) The IP camera shall have minimum 3.6 mm lens.’

[Page 35, clause C-5.4 (4)] — Substitute the following for the existing matter:

‘4) The mNVR shall support H.264 or H.265 or later video compression algorithm.’

[*Page 35, clause C-5.4 (11)*] — Substitute the following for the existing matter:

‘11) The mNVR will record location and time in normal, schedule based, alarm triggered and motion detection mode. Alarms triggered modes may include alarms triggered via digital I/O input, for example, emergency button, emergency door open, brake on, reversing, DVR enclosure open.’

[*Page 35, clause C-5.4 (14)*] — Substitute ‘or’ for ‘and’.

[*Page 35, clause C-5.4 (15) (c)*] — Substitute the following for the existing matter:

‘c) Built-in 4G module, supporting 2G/3G/4G (at least 900, 1 800 and 2100 MHz frequency bands), support for SMS, voice, data (GPRS, TCP/IP) with multiple network OTA switching capabilities.’

[*Page 35, clause C-5.4 (16)*] — Insert the following at the end:

‘The devices installed on or before 31 August 2020 may support embedded SIM or Plastic SIM for the above requirement. The status shall be reviewed before the end of the stipulated period.’

[*Page 35, clause C-5.4 (17)*] — Delete.

[*Page 35, clause C-5.4 (19)*] — Delete.

[*Page 35, clause C-5.4 (25)*] — Substitute the following for the existing:

‘25) The mNVR shall be capable of detecting any type of video tempering or the system shall be capable of detecting any type of video tampering.’

(*Page 35, clause C-5.4*) — Insert the following new clause:

‘36) The mNVR shall have tamper proof watermark or it shall be capable of detecting any type of tampering.

NOTE — Functions mentioned above could also be alternatively provided by ATD as per Annex A or this feature could also be demonstrated through in-built feature of ATD as per Annex A.’

[*Page 36, clause C-6, Sl No. i) (a)*] — Insert the following at the end:

‘either physical or on a touch screen,’

(Page 38, clause **C-7.1.3**, Table) — Substitute ‘Any microphone disconnect. Requirement of microphone multi-function status indication may be exempted if microphone is inbuilt in the camera.’ for ‘Any microphone disconnect’.

(Page 38, clause **C-7.1.4**, Table) — Insert the following at the end of the table:

‘NOTE — Ignition On, Ignition Off, Harsh Braking, Harsh Acceleration and Rash Turning Alerts can alternatively be also be provided by vehicle tracking devices approved as per Annex A.’

[Page 40, clause **C-8** (20)] — Substitute ‘High voltage test (*see* **C-10.2.4**).’ for the existing matter.

[Page 40, clause **C-8** (35)] — Delete.

(Page 42, clause **C-10.1.4**) — Substitute the following for the existing matter:

‘C-10.1.4 IP Camera Video Compression Support

Applicable for: IP Cameras.

The IP CCTV cameras should support H.264 or H.265 or later, MPEG-4 and M-JPEG video compression standards. The IP CCTV cameras will be tested for supporting all these compression standards. The future IP CCTV cameras which support H.264 or H.265 or later video compression standard will be tested for this also.

Acceptance criteria: The IP CCTV camera should support H.264 or H.265 or later, MPEG-4 and MJPEG video compression standards. The future IP CCTV cameras should support H.265 or later video compression standard also.’

(Page 42, clause **C-10.1.6**) — Insert the following at the end of the clause:

‘The supplier would provide self-certification for the above specification.’

(Page 42, clause **C-10.1.7**) — Substitute ‘H.264 or H.265, or later’ for ‘H.264’

(Page 44, clause **C-10.1.16**) — Substitute the following for the existing matter:

‘Applicable for: IP Cameras/mNVR/Hybrid.

The IP CCTV cameras and mNVR should be ONVIF profile S compliant. The IP CCTV cameras and mNVR will be tested for compliance to ONVIF profile S standards.

Acceptance criteria: The IP CCTV camera and mNVR should be compliant to ONVIF profile S standards.

NOTE — Wherever the Test method is not specified, supplier will demonstrate the compliance to the satisfaction of test agency’

(Page 44, clause **C-10.2.1**, line 15) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 45, clause **C-10.2.2**, line 19) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 45, clause **C-10.2.4**,) — Rename test as ‘High voltage test’ in place of ‘Over voltage protection test’.

(Page 45, clause **C-10.3.1**, line 10) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 45, clause **C-10.3.1**) — Insert the following at the end of the clause:
‘Device should be free from any kind of deformation, cracks, damage, etc.’

(Page 46, clause **C-10.3.2**, line 9) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 46, clause **C-10.3.2**) — Insert the following at the end of the clause:
‘Device should be free from any kind of deformation, cracks, damage, etc.’

(Page 46, clause **C-10.3.3**, line 10) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 46, clause **C-10.3.3**) — Insert the following at the end of the clause:
‘Device should be free from any kind of deformation, cracks, damage, etc.’

(Page 46, clause **C-10.3.5**, line 12) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 46, clause **C-10.3.5**) — Insert the following at the end of the clause:
‘Device should be free from any kind of deformation, cracks, damage, etc.’

(Page 46, clause **C-10.3.6**, line 8) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 46, clause **C-10.3.6**) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 47, clause **C-10.3.10**, line 5) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 47, clause **C-10.3.10**) — Insert the following at the end of the clause:
‘Device should be free from any kind of deformation, cracks, damage, etc.’

(Page 47, clause **C-10.4**) — Delete.

(Page 47, clause **C-11**) — Delete.

(Page 47, Table 14) — Delete.

(Page 48, clause **C-12**) — Delete.

(Page 48, Table 15) — Delete.

[Page 50, clause **D-2.2** (5)] — Substitute the following for the existing matter:

‘5) The mDVR shall support H.264 or H.265 or later video compression algorithm.’

[Page 50, clause **D-2.2** (16) (c)] — Substitute the following for the existing matter:

‘c) Built-in 4G module, supporting 2G/3G/4G (at least 900, 1 800 and 2 100 MHz frequency bands),

Support for SMS, voice, data (GPRS, TCP/IP) with multiple network OTA switching capabilities.’

[*Page 52, clause D-2.3 (5)*] — Substitute the following for the existing matter:

‘5) The system’s GNSS module shall have an acquisition sensitivity of minimum (-) 145 dBm with GNSS/ (-) 140 dBm with IRNSS (NAVIC as applicable).’

[*Page 52, clause D-2.3 (6)*] — Substitute the following for the existing matter:

‘6) The system’s GNSS module shall have a tracking sensitivity of minimum (-) 160 dBm with GNSS / (-) 153 dBm with IRNSS (NAVIC as applicable).’

[*Page 52, clause D-2.3 (8)*] — Substitute the following for the existing matter:

‘8) The system should have,

- a) the capability of hot start <10s,
- b) the capability of warm start <60s, and
- c) the capability of cold start <120s.

The above timing is applicable after DVR boots up.’

[*Page 52, clause D-2.4 (5) (see also Amendment No. 1)*] — Substitute ‘later’ for ‘latter’.

[*Page 53, clause D-2.5 (4)*] — Substitute the following for the existing matter:

‘4) The mNVR shall support H.264 or H.265 or later video compression algorithm.’

[*Page 53, clause D-2.5 (14)*] — Substitute ‘or’ for ‘and’.

[*Page 53, clause D-2.5 (15) (c)*] — Substitute the following for the existing matter:

‘Built-in 4G module, supporting 2G/3G/4G (at least 900, 1 800 and 2 100 MHz frequency bands), Support for SMS, voice, data (GPRS, TCP/IP) with multiple network OTA switching capabilities.’

(*Page 53, clause D-2.5*) — Insert the following at the end:

‘36. The mNVR shall have tamper proof watermark or it shall be capable of detecting any type of tampering.

NOTE — Functions mentioned above could also be alternatively provided by ATD as per Annex A or this feature could also be demonstrated through in-built feature of ATD as per Annex A.’

[*Page 54, clause D-2.6 (1)*] — Substitute the following for the existing:

‘1) The system should support any operational GNSS system (Location, speed, heading, time stamp) data polling and capable of sending this data at a frequency of less than or equal to 10 s. The devices installed on or after 1st January 2020 should also support Indian Regional Navigation Satellite System (IRNSS).’

[*Page 55, clause D-2.6 (5)*] — Substitute the following for the existing matter:

‘5) The system’s GNSS module shall have an acquisition sensitivity of minimum (-) 145 dBm with GNSS/ (-) 140 dBm with IRNSS (NAVIC as applicable).’

[*Page 55, clause D-2.6 (6)*] — Substitute the following for the existing:

‘6) The system’s GNSS module shall have a tracking sensitivity of minimum (-) 160 dBm with GNSS / (-) 153 dBm with IRNSS (NAVIC as applicable).’

[*Page 55, clause D-2.6 (8)*] — Substitute the following for the existing matter:

‘8) The system should have:

- a) The capability of hot start <10s,
- b) The capability of warm start <60s, and
- c) The capability of cold start <120s.

The above timing is applicable after mNVR boots up.’

(*Page 55, clause D-2.6*) — Insert the following at the end:

‘12) Specifications for VTD in case of Inbuilt MNVR will comply with all requirements given in Annex A

13) Code of Practice shall also include procedure for replacement of any faulty VTD device during the warranty period.’

(*Page 55, clause D-3*) — Insert the following at the end:

‘The emergency buttons will be connected in a manner such that in case of press of any emergency button, both mNVR and the vehicle tracking device get the alert signal.’

[Page 55, clause **D-4.1** (a)] — Insert the following at the end:
‘either physical or on a touch screen,’

(Page 58, clause **D-5.2.4**, Table) — Insert the following at the end of the table:

‘NOTES:

1 Requirement of microphone multi-function status indication may be exempted if microphone is inbuilt in the camera.

2 Ignition status may be provided via VTD device also

3 Location of camera shall be obtained from VTD.’

(Page 59, clause **D-5.3**, Table) — Insert the following at the end of the table:

‘NOTE — Ignition On, Ignition Off, Harsh Braking, Harsh Acceleration and Rash Turning Alerts can alternatively be also be provided by Vehicle Tracking Devices Approved as IS 16833 Annex A.’

[Page 60, clause **D-5.3**, *Sl No. ii, iii) and iv) of Table*] — Substitute the following for the existing matter:

<i>Sl No.</i>	<i>Attribute</i>	<i>Value/Description</i>	<i>Size</i>
ii)	Packet type	Message Types supported. Emergency Message (EMR) or Stop Message (SEM)	Character, 2 bytes
iii)	IMEI No	Unique ID of the Vehicle (IMEI Number)	Character, 15 bytes
iv)	Packet Status	NM – Normal packet, SP – Stored packet	Character, 2 bytes

(Page 62, clause **D-6**) — Substitute ‘Device Level Functional, Performance and Durability Tests’ for ‘Type Test’ in the heading.

(Page 63, clause **D-7**) — Delete.

(Page 64, clause **D-8.1.4**) — Substitute the following for the existing clause:

‘D-8.1.4 IP Camera Video Compression Support

Applicable for: IP Cameras.

The IP CCTV cameras should support H.264 or H.265 or later, MPEG-4 and M-JPEG video compression standards. The IP CCTV cameras will be tested for supporting all these compression standards. The future IP CCTV cameras which support H.264 or H.265 or later video compression standard will be tested for this also.

Acceptance criteria: The IP CCTV camera should support H.264 or H.265 or later, MPEG-4 and MJPEG video compression standards. The future IP CCTV cameras should support H.265 or later video compression standard also.'

(Page 63, clause **D-8.1.6**) — Substitute the following for the existing clause:

D-8.1.6 IP Camera Audio Compression Support

IP Camera Audio Compression Support

Applicable for: IP cameras.

The IP CCTV cameras should support G.711 or G.726 audio compression standards.

Acceptance criteria: The supplier shall provide self-certification for the above specification.'

(Page 64, clause **D-8.1.7**) — Substitute the following for the existing clause:

D-8.1.7 mDVR/mNVR Video Compression Support

Applicable for: mDVR/mNVR/Hybrid.

The mDVR/mNVR/Hybrid should support H.264 or H.265, or later video compression algorithm.

Acceptance criteria: The supplier would provide self certification for the above specification.'

(Page 66, clause **D-8.1.16**) — Substitute 'The IP CCTV cameras and mNVR should be ONVIF profile S compliant.' for 'The IP CCTV cameras and mNVR should be ONVIFprofile S compliant to ensure integration of IP CCTV equipment from different suppliers.'

(Page 66, clause **D-8.2.1**, line 14) — Substitute 'tracking functionality' for 'functional'.

(Page 67, clause **D-8.2.2**, line 18) — Substitute 'tracking functionality' for 'functional'.

(Page 67, *clause D-8.2.2, line 30*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 67, *clause D-8.2.4*) — Rename test as “high voltage test” in place of ‘Over voltage protection test’.

(Page 68, *clause D-8.3.1, line 10*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.2, line 9*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.3, line 11*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.5, line 12*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.6, line 9*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.6*) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 68, *clause D-8.3.7, line 9*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.9, line 16*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 69, *clause D-8.3.10, line 5*) — Substitute ‘tracking functionality’ for ‘functional’.

(Page 68, *clause D-8.3.1*) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 68, *clause D-8.3.2*) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 68, clause **D-8.3.3**) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 68, clause **D-8.3.5**) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 68, clause **D-8.3.10**) — Insert the following at the end of the clause:
‘Device should be free from any kind of corrosion’.

(Page 69, clause **D-8.4**) — Insert the following at the end of the clause:
‘The above given requirements may be demonstrated on any server.’

(Page 69, clause **D-8.4**) — Insert the following at the end of the clause:
‘Protocol is a set of rules to be followed by the device while sending data to the backend. The protocol comprises data update rate, number of fields, start character, end character, alert type, etc. Protocol testing involves checking the compliance of data sets received by the backend against the protocol both with respect to the data fields as well the format. It is expected that the data coming to a central server should be exactly as required under the protocol. Table 17 mentions the validation process for the protocol communication. The following test would be performed along with the protocol testing of the device:

- a) Memory storage — The device should support 40 000 or more positional logs/packets. This is a functional test and the device will be simulated to be in non – GPRS coverage area and the logs will be maintained. The capacity of logging will be checked by monitoring the logs on the device.
- b) Messages and alerts from devices — Table 18 contains the listing of alerts that need to come from the tracking devices. These alerts are applicable for both live packets as well as the history packets. The above given requirements may be demonstrated on any server.’

(Page 69, clause **D-9.1.1**(see also Amendment No. 1)) — Substitute the following for the existing:

D-9.1.1 Functional Testing

Functional testing will be carried out to assess the performance of the tracking device on important functional aspects as below:

- a) *Tracking functionality test* — The test shall be conducted on VTL to determine the proper functioning of VLT with emergency button by testing its connectivity to backend control centre (Government authorized server).

Procedure: The system with emergency button shall be connected to vehicle battery to switch it on. The VLT with emergency button shall be tested for the connectivity to server and its capability to send two location messages.

- b) *Location accuracy test* — This test shall be conducted on VLT with emergency button. The receiver is placed into a cold start state, usually by a command sent to the receiver through a test connection, and then a fairly strong navigation signal simulating in L and/or S band is sent. The time it takes for the receiver to determine its first good location fix is recorded. Test is done many times (>15 times) over many conditions and the results are averaged.

Acceptance Criteria: 2.5 m CEP or 6m 2DRMS

- c) *Cold-start time to first fix (TTFF) test* — This test is used to determine the time taken for first fix during a cold start of the device. The device in this test is placed into a cold start state. The time it takes for the device to determine its first good location fix is recorded. The cold start test is performed several times and the results are averaged.

Acceptance Criteria: The cold start TTFF shall be less than 120 s at Open Sky condition or (-) 130 dBm.

- d) *Warm-start time to first fix test* — This test is used to determine the time taken for first fix during a warm start of the device. In this test the device is started in warm start mode and time taken by device to determine the first valid location fix is recorded. This is done several times and results are averaged.

Acceptance Criteria: The warm start TTFF should be less than 60 s at (-) 130 dBm

- e) *Hot-start time to first fix test* — This test is used to determine the time taken for first fix during a hot start of the device. In this test the device is started in hot start mode and time taken by device to determine the first valid location fix is recorded. This test is performed several times and results are averaged.

Acceptance Criteria: The hot start TTFF should be less than 10 s.

- f) *Acquisition sensitivity test* — Acquisition sensitivity refers to the minimum signal level at which the device is able to successfully perform a cold start TTFF. The acquisition sensitivity test is a simulated signal test. A device cold start is performed, and the time to acquisition is measured. Signal levels are then progressively decreased until the device can no longer acquire the location. This signal strength is recorded.

Acceptance Criteria: The acquisition sensitivity shall be minimum (-) 145 dBm with GNSS/ 140 dBm with IRNSS (NAVIC as applicable.).

- g) *Tracking sensitivity test* — Tracking sensitivity refers to the minimum signal level at which the device is able to successfully maintain the location fix. The acquisition sensitivity test is a simulated signal test. Test setup for the tracking sensitivity receiver test is as shown in Fig. 3. The device under this test is locked on to the simulator's output frequency and the simulator power output is lowered until the lock is lost. Multiple repetition of the test with different satellite geometries ensures that an accurate average measure is recorded.

Acceptance Criteria: The tracking sensitivity shall be equal to or better than (-) 160 dBm with GNSS / 153 dBm with IRNSS (NAVIC as applicable).

- h) *Functional endurance test* — VLT device shall be operated for 96 h with external power supply and internal battery connected to device. PVT data monitoring will be done for complete duration of test with data frequency defined after IGN switch 'ON' mode. VLT device shall function successfully during and after test.
- j) *On vehicle dynamic location test* — VLT devices will be mounted on any target vehicle connected with vehicle battery. Target vehicle with VLT devices will be run for 10 km on pre-defined track/route to verify dynamic location test. VLT device PVT data shall be within ± 6.0 m for more than 90 percent of the fixed location data.
- k) *SIM testing* — This test is to check the suitability of the SIM and communication module. The test shall be conducted to determine the effectiveness and operation of the GPRS module with OTA network switching capabilities on demand as well as automatically in real-time. The device would be tested to perform as per the protocol using an embedded SIM/UICC. The GPRS module and SIM, shall support SMS and Data (GPRS, TCP/IP).

Acceptance Criteria: In the testing, vendors has to demonstrate the embedded SIM/UICC based tracking and multiple network OTA switching capabilities (On demand as well as automatic switching on real-time basis) for effective network management and transmission.'

(Page 72, *clause D-9.1.2*) — Delete.